Standard Operating Procedure **SOP016**

Title: Use and Maintenance of Fridges & Freezers

Location: CBE Laboratories

1. PURPOSE

To describe the use and maintenance of the fridges (4^0C) and freezers (-20^0C) in the CBE laboratories

2. SCOPE

The scope of this SOP is to describe the use and maintenance of the fridges and freezers that are located in the CBE laboratories. This SOP describes the general maintenance requirements to ensure the safe storage of biological agents, cell culture stock items, such as media and serum, as well as general laboratory reagents. **To ensure compliance with COSHH regulations, this SOP must be read in conjunction with SOP003; "Storage and Transport of Biological Agents" and SOP039; "Disposal of Waste Chemicals and Solvents".** This SOP does not cover the temperature monitoring of the equipment, or liquid nitrogen stores, which are described elsewhere in SOP028 & SOP013 respectively. SOP049 covers the -80C freezers and SOP027 covers the cold room H17.

3. RESPONSIBILITES

CBE Laboratory Users

It is the responsibility of the laboratory staff to:

(i) Ensure that all stored material is labelled correctly and has the appropriate risk assessment.
(ii) If nominated by the lab manager, to ensure that the steps outlined in this SOP are followed when defrosting and cleaning any fridges or freezers which may contain biological materials.
(iii) Report any leakages/spillages of stored material, overcrowding or excessive build up of ice to the laboratory manager or safety officer.

Responsible Person (RP)/Laboratory Manager (LM)

It is the responsibility of the lab manager to:

(i) Ensure the safe storage of all material in the fridges and freezers designated in this SOP.
(ii) Ensure that the routine cleaning and defrosting of the designated fridges and freezers is carried out according to this SOP.
(iii) Inspect the fridges and freezers every 6 months to identify and remove any substances that are unlabelled, out of date or without an appropriate COSHH assessment.

4. EQUIPMENT AND MATERIALS

- Labcold Refrigerator Located in H20
- LEC Sparkfree Fridge located in Room H23
- Labcold Sparkfree Refrigerator located in H23
- Labcold Freezer located in H23
- Labcold Sparkfree Refrigerator Located in Room H25
- Labcold Sparkfree Freezer Located in Room H25
- Labcold Sparkfree Refrigerator & Freezer located in Room H27
- LEC Freezer Located in H29
- LEC Refrigerator Located in H29
- LEC Freezer located in H30
- Whirlpool Refrigerator & Freezer located in Room H34
- Liebherr Freezers x 3 Located in H34
- Bush Fridge Freezer located in H34
- Thermo Fisher Freezer located in the CTMF store room
- Liebherr Fridge and Freezer located in the CTMF (Integrated)
- Norfrost Chest Freezer located in CTMF store room
- Liebherr Freezer Located in H18
- Labcold Freezer Located in H18
- LEC Freezer Located in H18
- Refrigerator located T208b (Wolfson School)
- Fridge located in T208b (Wolfson School)
- LEC Freezer Located in T208b (Wolfson School)
- 1% Virkon Solution
- 70% IMS Solution
- 2% Detergent Solution (Neutracon)

5. PROCEDURE

5.1 Use of the fridges and freezers

5.1.1 Temperature control

The fridges and freezers are maintained at temperatures outlined in SOP028; “Temperature Monitoring of Refrigerators and Freezers”.

5.1.2 Storage of study related substances

(i) Where practicable, each study should have designated areas in the fridges and freezers, segregated as either sealed bags, boxes or separate shelves (within the requirement for safe storage of BAs & GMOs).

(ii) All study related substances must be properly labeled according to SOP007 and SOP005.

(iii) All study related substances stored in either a fridge and freezer should be recorded in the individual's laboratory workbook..

(iv) **NOTE:** At six monthly intervals the fridges and freezers shall be inspected by the Laboratory Manager/Lab Leaders to identify any substances that are unlabelled, out of date or without an appropriate COSHH assessment. The lab manager shall notify all relevant personnel before any such substance is removed and disposed of.

5.1.3 Storage of general-use non-hazardous substances

(i) General use substances should be stored in areas of the fridges and freezers not assigned to specific studies.

(ii) General use solutions and reagents must be labeled according to SOP007; "Labelling of General Reagents and Solutions".

(iii) **NOTE:** At six monthly intervals the fridges and freezers shall be inspected by the Laboratory Manager/Lab Leaders to identify any substances that are un-labelled, out of date or without an appropriate COSHH assessment. The lab manager shall notify all relevant personnel before any such substance is removed and disposed of.

5.1.4 Storage of hazardous substances

(i) Hazardous substances should be stored according to procedures and conditions identified in their risk assessment.

(ii) All potentially infectious materials containing BAs/GMOs must be clearly labelled. The storage space (e.g., freezer, refrigerator) should also be labelled with the universal biohazard symbol. Additional information including contact name and emergency numbers should be visible in case of emergency, i.e., freezer breakdown.

(iii) All GMOs stored in the freezer must be clearly identifiable with the GMO name, classification (risk assessment number), date of storage and the name of the research group. The box containing the GMOs must also be labelled and the storage system (fridge /freezer etc) must also be identified as containing GMOs. Refer to the local Code of Practice for further details (Reference 8).

(iv) All cultures of BAs/GMOs being stored inside the facility must be sealed during storage to prevent dissemination of the BAs/GMOs. NOTE: The type of container necessary to prevent the BAs/GMOs from escaping will vary depending on the type of organisms being stored.

(v) Storage of flammable or volatile liquids reagents, chemicals, poisons or samples must **NEVER** be stored in a fridge or freezer (or cold room) unless they are spark free (domestic refrigeration is not spark free for e.g.) i.e. have spark proof compressor and lighting units. **It is highly dangerous to store solvents with low flashpoints e.g. acetone, diethyl ether etc in a non-spark proof refrigerator or deep freeze.**

NOTE: Warning notices must be placed on all refrigerators/freezers which are not suitable for storing flammable materials.

(vi) Expired and other unwanted material must be decontaminated properly. Materials for long-term storage must be annually inspected and each container must be checked for cracks and other damages and properly disposed or replaced.

(vii) In the event of a freezer failure, all materials that are unable to be salvaged must be properly treated by autoclaving or chemical disinfecting.

(viii) All liquid reagents should be secured in racks or placed in suitable secondary containers to reduce risk of spillage. If spillage occurs, it should be cleaned up immediately according to procedures described in SOP038; “Biological Spill Response”.

(ix) All HTA Relevant material stored in Fridges and Freezers must be clearly labelled as such. The equipment should have a HTA label attached along with the owner of the materials contact details. All HTA material stored should be logged on Pro-curo traceability software.

5.1.5 Security

(i) All fridges and freezers containing bio hazardous materials should be kept locked at all times if they are located outside the laboratory.

(ii) BAs/GMOs or organisms containing BAs/GMOs may be stored outside the facility in a storage unit (freezer, fridge, controlled temperature room or other container). A biohazard symbol must be posted on the storage unit. The storage unit must be locked when not in use, unless access is restricted to the room or area where the storage unit is located. Access to the storage unit must be restricted or controlled to prevent unintentional release of BAs/GMOs into the environment.

(iii) BAs/GMOs or organisms containing BAs/GMOs being stored outside the facility must be double-contained. The primary container must be sealed to prevent the escape or release of BAs/GMOs and must be labelled. The primary container must be stored in an unbreakable secondary container. In the case of a small storage unit such as a fridge, freezer, the secondary container may be the storage unit.

5.2 Maintenance of the fridges and freezers

Fridges and freezers should be defrosted and cleaned every 6 months if practicable, or as deemed necessary. The appliance should be defrosted according to the steps described in Section 5.2.4, if any of the following conditions are observed:

(i) The thickness of the ice on the internal walls of the freezer reaches 5 to 6 mm in thickness.

(ii) In the event of leakage of biological materials onto the internal surfaces of the freezer.

(iii) The fridges/freezers are overcrowded and unsafe.

5.2.1 Cleaning and defrosting freezers and fridges

(i) A laboratory coat, safety spectacles and double gloves must be worn throughout the procedure described below.

(ii) Unplug the fridge or freezer

(iii) Remove the contents of the fridge/freezer and transfer to an operational fridge or freezer as appropriate. Any drawers should also be removed.

(iv) Inform the study leader/study personnel responsible for each of the samples of the temporary location of their samples.

(v) If samples require disposal, record the disposal date on the inventory log. NOTE: Samples or material should not be disposed of without prior consent of the laboratory manager. Procedures for disposal of samples should be in accordance with the appropriate risk assessment.

(v) Place plenty of absorbent paper on the floor in front of the appliance. Wearing gloves try and remove as much ice as possible, using a disposable cloth and hot water. CAUTION: the ice may contain contaminated material if a leakage has occurred.

(vi) After 20 minutes replace the absorbent paper (discard into yellow biohazard bags) with a dry layer of paper. Clean the removable drawers with 1% virkon followed by 70% IMS. NOTE: For layers of thick ice, a bowl of hot water can be placed inside the appliance.

(vii) When the appliance is thoroughly defrosted, dispose of the absorbent paper into yellow biohazard bags. Cover the area with absorbent paper towels soaked with 1% Virkon solution. Leave for 10 minutes (or manufacturer's recommendation). Place the soaked paper towels into a yellow biohazard disposal bag.

(viii) Wipe the area with the paper towels soaked in 1% Virkon solution. Place the used towels and gloves in the yellow biohazard bag/container.

(ix) Replace gloves and clean the inside of the appliance with 2% detergent and hot water. NOTE: Abrasive cleaners or solvents should not be used. Replace the drawers and switch the appliance back on.

(x) Once the temperature has reached its specification (see SOP028 "Temperature Monitoring of Refrigerators and Freezers", return the samples to their original location (unless a reorganization has been agreed with the lab manager) and inform the study leaders/personnel and the laboratory manager.

(xi) All maintenance must be recorded on the equipment maintenance records located on the door outside each laboratory.

5.3 Freezer Monitoring

i) Every month each Freezer must be monitored and inspected to ensure it is working optimally and being properly maintained. These checks must be performed by the responsible person for the equipment (or delegated individual) and all results must be recorded. Please refer *to HTA-PR-SOP011 Freezer Maintenance Schedule and manual challenge of freezer alarm* for full details.

The maintenance/inspection involved is:

a)Removal of ice build up
b)Inspection of filters
c)Temperature check using a calibrated thermometer
d)Manual challenge of the freezer alarm
e)Freezer defrost (if required).

5.4 Equipment Malfunction

(i) If any part of the equipment fails or malfunctions, the user should contact the Laboratory Manager. With permission of the Lab Manager the user should consult the Operator Instruction Manuals to access fault finding, error displays and troubleshooting procedures.

(ii) All problems and corrective actions should be recorded in the Maintenance Log (Section 6).

(iii) If the equipment fails to work or malfunctions and cannot be rectified according to troubleshooting procedures detailed in the Operator and Users Manuals the Laboratory Manager must be informed and a "Do Not Use" notice should be posted on the equipment. Contact the manufacturer for advice and coordinate with the Lab Manager for external maintenance and servicing.

(iv) External maintenance and servicing of the equipment can only be performed after it has been suitably disinfected (refer to SOP003 for further details) and a 'Decontamination Certificate' has been issued by the School/Building/Unit Safety Co-ordinator. An example of a Decontamination Certificate is given in Section 6

5.5 Fridge/Freezer Decommissioning Checklist

If the fridge/freezer needs to be decommissioned, for example due to relocation or change of use, it is necessary to ensure no hazardous materials are left behind and that the unit has been decontaminated and made safe for future use or removal. A checklist that can be used to record that the fridge/freezer has been suitably decommissioned is provided in Section 6

On completion, the form should be forwarded to Departmental Safety Officer or other responsible person to request its disposal. If multiple refrigerated items need to be disposed of together from the same room, it may be possible to use one form – as long as each item is listed and each has a "Safe for Disposal" sticker / note on it to confirm that appropriate cleaning / disinfecting has been carried out. A completed decommissioning checklist precludes the need for maintenance staff and contractors to be issued with a Laboratory Permit to Work.

6. DOCUMENTATION

The following records are outputs of this SOP:

- QS-FORM-009 Generic equipment decontamination certificate
- QS-FORM-010 – Cleaning and Maintenance record for fridge/freezers
- QS-FORM-012 – Fridge/Freezers decommissioning checklist
- HTA-FORM-013 – Freezer Maintenance Schedule

These records will be filed in the equipment file or otherwise archived for future review or retrieval.

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SOP Version History

Version Reviewed	Date Revised/ Reviewed	Revision Summary	New Version Number
1	13 January 2010 Revised by A. Chandra	1. Replaced Wolf Fridge/Freezer with Labcold SparkFree Fridge Freezer 2. Corrected the locations of all fridges and freezers. 3. Added Location H23 to the SOP as the Labcold fridge and Labcold freezer have been moved there. 4. Removed reference to Wolf Fridge which was left behind in the Wolfson School labs.	2
2	15 January 2010 Revised by Q.Rafiq	1. Included Labcold Sparkfree Refrigerator (RLPR09043) and Labcold Sparkfree Freezer (RLVF14201) 2. Added Location H25 to the SOP as new Labcold Refrigerator and Freezer are installed there. 3. Minor editorial corrections	3
3	17th August 2010 Revised by C. Kavanagh	1. Included Labcold Sparkfree Refrigerator (RLHD13043) & LEC Sparkfree Freezer (ISU97). 2. Added location of H27 to the SOP as the Refrigerator & Freezer are installed there. 3. Minor editorial corrections	4
4	27 September 2010 Revised by A. Chandra	1. Included Wolf Freezer ISU37 102L lockable freezer located in H23	5
5	2nd October 2012 Revised by C. Kavanagh	1.Transfered to the new lean SOP template 2. Minor format changes 3. Minor editorial changes due to lean review. 2. Included fridge & freezer in the Tissue Engineering laboratory (T208b) in the Wolfson School.	6
6	22nd October 2015. Revised by K.Sikand	1. Updated fridges and freezers list. 2. Minor editorial corrections.	7
7	12th December 2019 by	1)Updated fridge/Freezer list 2)Updated to include reference to HTA	8

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	C.Kavanagh	3)Updated to include new freezer maintenance schedule.	